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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/827,532	04/20/2004	Sang-chae Kim	277/037	2959

27849 7590 02/12/2007  
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FALLS CHURCH, VA 22042

EXAMINER
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NGUYEN, TAI V

ART UNIT	PAPER NUMBER
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3729

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/12/2007	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

**Office Action Summary**

Application No.

10/827,532

Applicant(s)

KIM ET AL.

Examiner

Tai Van Nguyen

Art Unit

3729

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 05 January 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) 16-24 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3 and 7-14 is/are rejected.
- 7) ☒ Claim(s) 4-6 and 15 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date 4/20/04, 11/1/04, 9/12/05
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Election/Restrictions***

1. Applicant's election of invention of Group I, claims 1-15 in the reply filed on 1/5/2007 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

### ***Specification***

2. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.
3. The following title is suggested: A METHOD FOR FABRICATING A FILM BULK ACOUSTIC RESONATOR.

### ***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1 and 8-11 are rejected under 35 U.S.C. 102(b) as being anticipated by Ruby (US 6,384,697).

As applied to claim 1, Ruby discloses a method for fabricating a film bulk acoustic resonator, the method comprising: providing a dielectric layer (50, Fig. 8) on a

Art Unit: 3729

substrate (46); providing a sacrificial layer (52) on a portion of the dielectric layer, while leaving a portion of the dielectric layer exposed to form an exposed dielectric layer; providing a bottom electrode (44) on the sacrificial layer and on the exposed dielectric layer; providing a piezoelectric layer (54) on the bottom electrode; providing a top electrode (58) on the piezoelectric layer; and removing the sacrificial layer (column 7, lines 49-64).

As applied to claims 8 and 9, Ruby discloses wherein an upper surface of the sacrificial layer is higher than an upper surface of the dielectric layer (see Fig. 8).

As applied to claim 10, Ruby discloses wherein the providing of the sacrificial layer includes filling the cavity (52) with a sacrificial material.

As applied to claim 11, Ruby discloses wherein the filling of the cavity includes depositing the sacrificial material on the dielectric layer and the cavity and planarizing the sacrificial material to provide the exposed dielectric layer (Fig. 8).

### ***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 2, 3, 7 and 13-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ruby (US 6,384,697) in view of Mang et al (US 5,692,279)

Art Unit: 3729

As applied to claim 2, Ruby discloses all of the limitations of the claimed invention except the step of providing a second dielectric layer on the top electrode.

However, Mang et al teach the step providing a second dielectric layer on the top electrode (column 4, lines 59-65+).

As applied to claim 3, Mang et al further disclose an adjusting a thickness of the second dielectric layer in accordance with a desired resonance frequency (column 4, lines 3-14).

As applied to claim 7, Mang et al disclose wherein the removing of the sacrificial layer forms an air gap between the bottom electrode and the dielectric layer (see Fig. 4)

As applied to claim 13, Mang et al disclose further comprising providing a second dielectric layer (27, Fig. 4) on the top electrode (24).

As applied to claim 14, Mang et al disclose further comprising adjusting a thickness of the second dielectric layer in accordance with a desired resonance frequency (column 4, lines 3-14).

It would have been obvious to one of ordinary skill in the art at this time the invention was made to have modified the method of Ruby by including a second dielectric, as taught by Mang et al, to positively improve fabricating of the thin film piezoelectric resonator lattice filter (column 1, lines 65-67).

8. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ruby in view of Ruby (US 6,377,137) herein after '137.

As applied to claim 12, Ruby discloses all of the limitations of the claimed invention except that the step of a chemical mechanical polishing process.

Art Unit: 3729

However, '137 teach a chemical mechanical polishing process (column 5, lines 31-40). It would have been obvious to one of ordinary skill in the art at this time the invention was made to have modified the method of Ruby by including a chemical mechanical polishing process, as taught by '137, to positively improve reduce the thickness of the substrate and to reduce electromagnetic influence in a resulting filter (column 2, lines 17-19).

***Allowable Subject Matter***

9. Claims 4-6 and 15 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

***Conclusion***

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.


11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tai Van Nguyen whose telephone number is 571-272-4567. The examiner can normally be reached on M-F (7:30 A.M - 4:30 P.M).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Peter Vo can be reached on 571-272-4690. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 3729

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

TN. January 31, 2007



A. DEXTER TUGBANG  
PRIMARY EXAMINER